

Remarks

The above Amendments and these Remarks are in reply to the Office Action mailed June 27, 2006.

A. Claim 68 has been amended so that the composition in step (a) consists essentially of a hydrophobic agent having a melting point or glass transition temperature of less than 100°C and an effective amount of a zeta potential modifier so that the composition has a zeta potential that is positive and greater than zero millivolts. Claim 68 has been further amended to claim fabric protective properties that are of transient durability, and also amended so that the composition in step (b) does not include an optional fluoropolymer providing increased oil repellancy. Support for these amendments to Claim 68 are found for example in Tables 6 and 18, example composition no's 74, 75, 93-99, and paragraphs 0198 and 0203 of the published application. In addition, Claim 68 has been further amended to claim compositions of a hydrophobic agent having a melting point or glass transition temperature of less than 100 °C and a zeta potential modifier wherein the ratio of the hydrophobic agent to the zeta potential modifier is greater than or equal to 1:3. Support for this amendment is found in Table 15, example composition no's 54-58, which demonstrate an unexpected critical weight ratio dependency as between the hydrophobic agent and zeta potential modifier present in the treatment composition with respect to water repellency of a fabric treated according to the methods of the present invention. Composition no's 54-58 described in Table 15 exhibit initial (t=0) and time elapsed (t=2 min.) water contact angles that relate to the water repellency properties of a fabric treated with the exemplified compositions. Compositions no. 54, 55, 56, 57 and 58 have a weight ratio (expressed in terms of 100 weight % as active material content excluding water) of hydrophobic agent (ingredient denoted with footnote b to Table 15) to zeta potential modifier (ingredient denoted with footnote c) of 1:10.88, 1:5.44, 1:3.63, 1:2.72 and 1:2.18, respectively. A sharp decline in

water repellancy benefit as manifested by an unexpected decrease in the water contact angle is observed at ratios of hydrophobic agent to zeta potential modifier of less than about 1:3, characteristic of a critical ratio existing between these components below which the protective benefit is significantly reduced; and wherein a weight ratio of greater than or equal to 1:3 is correspondingly observed to provide a significant increase in water contact angle to above about 95°. High water contact angles are known in the art to be associated with highly preferred water repellancy benefits in being effective in shedding water and in preventing aqueous based stains, such as from spilled beverages, drinks, and foods, from wetting the surfaces of fabric exhibiting high water contact angles to provide fabric protective properties.

Accordingly, the method of employing compositions having hydrophobic agent and zeta potential modifier present at or above the critical ratio of 1:3 produces an unexpected water repellency benefit. This is demonstrated by the high water contact angles above about 100° seen by employing inventive compositions no. 54, 55 and 56 with ratios of hydrophobic agent to zeta potential modifier of greater than or equal to 1:3, while compositions 57 and 58, despite having the same weight % level of the hydrophobic agent present as in the inventive composition no's 54-56, have zeta potential modifier present at a ratio below 1:3 and are correspondingly observed not to provide the beneficial degree of water contact angle desired for improved water repellency effect.

The critical ratio is independent of the presence and any contributory repellency effect owing to the optional fluoropolymer present in the inventive compositions 54-56, as well as compositions 57-58; water contact angle results collectively demonstrating that the critical ratio effect observed is independent of the optional fluoropolymer material present at a fixed level in each of the compositions of Table 15.

B. New Claims 71-89 have been added.

Support for new claim 71 is found for example in paragraphs 0044 and 0220 of the published application.

Support for new claim 72 is found for example in paragraphs 0032 through 0035 of the published application.

Support for new claim 73 is found for example in paragraph 0176 and 0178 of the published application.

Support for new claim 74 is found for example in paragraphs 0026 through 0029, and 0027 and 0220 of the published application.

Support for new claim 75 is found for example in paragraph 0031 of the published application.

Support for new claim 76 is found for example in paragraph 0044 and 0220 of the published application.

Support for new claim 77 is found for example in paragraph 0045 through 0052 of the published application.

Support for new claim 78 and 79 is found for example in paragraphs 0045 and 0046, respectively, of the published application.

Support for new claims 80, 81 and 82 is found for example in paragraphs 0194 through 0198 and Table 6 of the published application.

Support for new claims 83 through 86 is found for example in paragraphs 0177, 0198 and 0219 of the published application.

Support for new claims 87 through 89 is found for example in paragraphs 0179, 0180, 0218 and 0220 of the published application.

C. (a) Claims 68-70 were pending in the Application prior to the outstanding Office Action.

Pursuant to Examiner's Action # 7, claims 68-70 were rejected under 35 U.S.C. 103(a) as obvious over Haq et al. (U.S. Patent No. 6,075,003).

Haq et al. is said to teach a fabric laundry treatment composition comprising: a) a fluorocarbon polymer or a fluorocarbon copolymer or mixture thereof; b) a deposition aid comprising a cationic softening compound or a polymeric delivery aid or mixtures thereof.

Haq is said to teach that the fluorocarbon polymer is a perfluoroalkyl acrylic copolymer, a perfluoroalkyl methacrylic copolymer, a fluorinated substituted urethane or a fluorinated acrylic copolymer. A preferred fluorocarbon polymer is said to be present as a cationic emulsion such as a cationic emulsion is Zonyl 6991 an acrylate polymer.

With respect to the hydrophobic agent, Haq et al. is said to teach that it is preferable if the cationic emulsion of fluoropolymer further comprises a paraffin wax.

With respect to the curing step, Haq et al. is said to teach that after treatment of laundry with the fabric conditioner of the invention, the laundry is heat treated to cure the fluorocarbon polymer by tumble drying the laundry or by ironing.

With respect to the cationic zeta potential modifier, Haq et al. is said to teach that it is advantageous for environmental reasons to use quaternary ammonium material that is biologically degradable. Specifically, Haq et al. is said to teach that suitable deposition aids include cationic fabric softening compounds and polymeric delivery aids that are able to attach themselves to the fluorocarbon soil release agent and cause enhanced delivery to the fabric.

Haq et al. is said to teach a fabric laundry treatment composition comprising:

- a) a fluorocarbon polymer or a fluorocarbon copolymer of mixture thereof;

- b) a deposition aid comprising a cationic softening compound or a polymeric delivery aid or mixtures thereof, citing the examples in Column 5-8 as illustrating the utility of the cationic zeta potential modifier.

Finally, Haq et al is said to provide a method of treating fabrics to provide them with soil repelling properties comprising the steps of:

- i) adding the formulation described above to water;
- ii) washing, or preferably rinsing, laundry in the resulting liquor;
- iii) drying the laundry;
- iv) ironing the laundry at a temperature above 150°.

The Examiner concedes that Haq et al. do not teach a method of treating a fabric with a composition comprising a hydrophobic agent and a zeta potential modifier and curing said fabric at a temperature above ambient temperature but less than 100°C.

The Examiner, however, reasoned that It would have been obvious to treat a fabric with a composition comprising a hydrophobic agent and a zeta potential modifier and curing said fabric at a temperature above ambient temperature but less than 100°C because Haq et al. is said to teach the optional treatment of the fabric with an iron and further suggest the use of a tumble dryer with provide heat at various temperatures.

In addition, the Examiner concluded that it would have been obvious to treat a fabric without saturating the fabric, as recited by the claims, because the teachings of Haq et al. suggest washing and rinsing the fabric with the treatment composition.

Applicants submit that Haq et al. does not teach or suggest curing fabrics at a temperature above ambient but less than 100°C in order to impart fabric protective properties which include water repellancy and stain resistance. Rather, Haq et al. teaches “line drying” fabrics followed by ironing at 210°C. (See, col. 5, lines 59-60, and col. 7, lines 44-45.) Alternatively, Haq et al.

teaches just line drying fabrics without ironing. (Col. 9, lines 1-17.) In either case, Haq et al. does not teach curing at a temperature which is above ambient but less than 100°C. “Line drying” is at ambient conditions.

While Haq et al. does state at column 2 lines 39-45 that curing fluorocarbon polymer can be done by tumble drying or by ironing, where the iron is preferably hot (above 150°), Haq et al. does not suggest tumble drying at less than 100°C. As noted in the present application at paragraphs 0003 and 0008, commercial drying ovens and hot dryers can attain temperatures well over 100°C. It is submitted that a person of ordinary skill when viewing Haq et al. as a whole would be motivated to use ironing or to use very high temperature tumble drying that is above 100°C, rather than a heating cycle providing lower maximum temperature such as that obtainable using a tumble dryer set to either a permanent press or delicate fabric setting to limit drying temperature.

Further, Haq et al. does not teach or suggest any control of the maximum temperature in any method (such as ironing or tumble drying) to specifically limit the temperature to a temperature above ambient but below 100°C in order to achieve fabric protective properties that are of a transient durability. Rather, Haq et al. teaches away from this by numerous examples (Examples 1-4, Formulations 9, 15-18, 21) where treated materials were first dried and then ironed at high temperature in an ironing step (temperature greater than 150°C), or line-dried and then ironed at 210°C. Further, Haq et al., in Example 21 in which the effect of heating is evaluated, present data that teaches away from that of the present invention, where Formulation 21 performance is compared with regards to water/IPA and Olive Oil repellancy on a prewashed cotton sheet between two post treatment conditions, being in one instance line drying only, and in a second instance ironing at a high temperature of 210°C. Haq et al. present results (Page 9, Line 5) that show that heating at the high temperature actually results in a reduced performance

in that both water/IPA and olive oil soil repellancy (%) values of treated fabric decrease, indicated in a significant reduction in the soil repellancy %. Further, Haq et al., albeit parenthetically through presentation of results on a non-inventive Formulation F, a fluoropolymer treatment not containing a hydrophobic material, demonstrate that one skilled in the art would expect a similar decrease in overall soil repellancy % as a result of the ironing step at such high ironing temperatures (at least 210°C), and by reasonable inference including the ironing temperature of 150°C presented by Haq et al. as typically achieved during ironing. Thus, it is maintained that Haq et al. teach a heating method that employs temperatures in great excess of the melting point or glass transition temperature of a protective agent to create more durable surface protective properties at the expense of instant stain repellancy performance, in direct contrast to the object of the present invention.

While Haq et al. may appear to parenthetically mention that the cationic emulsion of fluoropolymer preferably also includes a paraffin wax, it is submitted that there is no teaching or suggestion of employing a hydrophobic agent in the amount defined in the claims. Accordingly, Haq et al. does not teach nor suggest any criticality in the control of the zeta potential of a treatment liquid containing a hydrophobic agent so that the zeta potential is positive and greater than zero millivolts. Further, Haq et al. does not teach or suggest the control of the zeta potential of a treatment liquid containing a hydrophobic agent so that the zeta potential is positive and greater than zero millivolts but less than about +150 millivolts.

It is submitted that Haq et al. teach essentially cationic fabric softening compositions and methods employing these cationic fabric softening compositions that are designed to deposit an effective level of a cationic fabric softening compound onto the fabric surface with a fluorocarbon polymer present, without any control of the zeta potential of the treatment liquor composition. Thus, Haq et al. teach a method of deposition of a cationic material onto the fabric

surface with a fluorocarbon polymer present, rather than a method of depositing a fabric protective material onto the fabric surface without requiring codeposition of a cationic deposition aid. The deposition aids taught and claimed by Haq et al., the cationic softening compounds having two C12-22 alkyl or alkenyl groups connected to the quaternary ammonium via at least one ester link, are well known in the art to be fatty, poorly water soluble cationic materials that attach to fabric surfaces owing to a combination of paired charge and solubility mechanisms to deposit on the surface for the purpose of providing fabric softening benefits. For the purposes of Haq et al., this amounts to a brute-force coating of the fabric surface to achieve a cationic surface charge (high zeta potential of the treated surface) favorable to retain the fluorocarbon polymer. This is in contrast to the method of the present invention, whereby control of the zeta potential of the treatment liquor is used to effectively neutralize the surface charge of the fabric to effect deposition of a hydrophobic agent without requiring the deposition of any substantial or excess cationic material on the fabric surface, as supported by noting that the preferred cationic materials of the present invention (See paragraph 0045 of the published application) employed as zeta potential modifiers include those cationic materials that are water soluble or water dispersible or water insoluble suspensions (See paragraph 0053) of cationic materials that are not materials known in the art to be used as fabric softening agents for the purpose of depositing onto fabric surfaces.

C. (b) With respect to currently amended and new claims.

Haq et al. neither teaches nor suggests any critical ratio of effect in fabric protective properties, particularly with regard to water contact angle or water repellency effect, with respect to the operation of a critical ratio between a hydrophobic agent and a zeta potential modifier. While Haq et al. claims a lower ratio of effect as between a fluorocarbon polymer and a

deposition aid comprising a quarternary ammonium-cationic softening compound, this relates to a ratio of components not claimed by the present invention.

Thus, Haq et al. fails to provide any suggestion of combining a hydrophobic agent and a zeta potential modifier with respect to a weight ratio between the components at or above a critical ratio as claimed in the present invention, nor any motivation to one skilled in the art to explore this relationship of effect. Further, such a critical ratio would not be obvious to one skilled in the art, in light of Haq et al., where there is no teaching or suggestion to modify the ratios of a paraffin wax (optional component as per Haq et al.) and the quarternary ammonium-cationic softening compound employed therein. Rather, Haq et al. focuses solely on a ratio of effect between a quaternary ammonium-cationic softening compound and a fluorocarbon polymer, and fails to offer suggestions or motivation to one skilled in the art as to any desirable ratio with respect to a paraffin wax as hydrophobic agent.

Accordingly, it is maintained that Haq et al. neither teaches nor suggests the claimed methods nor material limitations of the present invention, nor would one trained in the art be motivated to explore or modify the teachings of Haq et al. to render obvious the claimed invention.

D. Pursuant to Examiner's Action # 8, claims 68-70 were rejected under 35 U.S.C. 103(a) as being unpatentable over Gresser (U.S. Patent No. 4,724,095) in view of Haq et al. (U.S. Patent No. 6,075,003).

Gresser is said to teach a detergent composition that is adopted to wash textile substrates and impart stain repellancy and antiredeposition properties using a composition having a hydrophilic/hydrophobic anti-redeposition copolymer that reduces the zeta potential of the fibers of the textile substrate to a value of 0.5 times or less the zeta potential of the bare fiber content.

Gresser is said to teach a hydrophobic agent (Col 6, line 9-18) that are encompassed by the material limitations of the instant claims.

Gresser is said to teach various cationic agents (Col 6, 5, 31, 29 and co. 9, line 11) in regard to zeta potential modifiers.

Gresser is further said to teach utility of a fluorescent whitening agent (Col 6, line 43) in regard to the fluoropolymer.

Gresser is also said to teach detergent compositions comprising various non-ionic surface active agents (Col 9, line 1-5) in regard to additives.

Gresser is further said to illustrate an antiredeposition composition comprising the hydrophobic agent, zeta potential modifier and fluoropolymer added to the wash medium before the wash cycle of the washing machine containing the fabrics to be treated.

The examiner concedes that Gresser does not teach curing the fabric at a temperature above ambient temperature but less than 100 C.

However, the examiner asserts that it would have been obvious to one skilled in the art, at the time the present invention was made, to take the fabric as treated by compositions taught by Gresser and in the manner taught by Gresser via a wash medium, and cure them according to the manner taught by Haq et al., being to cure the fluoropolymer at various temperatures in general, owing to the use of a tumble dryer which provides heat at various temperatures.

In regards to Gresser, the applicant respectfully asserts that there is no showing of a method to select or adjust the zeta potential of a treatment liquor for means of depositing a hydrophobic agent, because Gresser employs copolymers which themselves modify the surface of the treated substrate to effect a change in the zeta potential of the fabric compared to that of an untreated bare fiber. The copolymers encompassed by Gresser are deposited onto the surfaces of the fiber to result in a change in the zeta potential of the surface of the fabric owing to their

deposition at a sufficiently high level (0.02 mg/g or fabric – see Col. 4, line 64) to reduce the zeta potential of the fabric surface itself to a value equal to or less than 0.5 times that of the untreated fiber (see Col 4 Line 59). Although Gresser does not disclose a mechanism, the applicant asserts that this is an inherent property of the polymer, which by absorbing onto the previously bare fabric surface, acts to neutralize or shield charged groups on the fabric surface in direct proportion to the quantity absorbed, up to the limit disclosed by Gresser as sufficient to obtain a benefit. The polymer materials employed by Gresser are copolymers having both hydrophobic and hydrophilic monomer constituents, so that their absorption onto the fabric is by means of attractive forces irrespective of any zeta potential effects. Accordingly, there is no disclosure in Gresser, and particularly no zeta potential modifiers disclosed, that would teach or suggest their use, nor selection or adjustment of the zeta potential of the treatment liquor employing zeta potential modifiers, to provide enhanced deposition of the hydrophobic material according to the present invention.

The examiner's assertions with regards to the ancillary materials thought to suggest use of hydrophobic materials, zeta potential modifiers and fluoropolymer materials are taken out of context with regard to Gresser's disclosure. For example, the hydrophobic materials cited by the examiner (Gresser Col 6, line 9-18) are components of a staining material used by Spangler as an artificial test soil to mimic human sebum soil merely for the purposes of testing soil repellency of a treated fabric. Gresser neither teaches nor employs these materials as a material part of his invention.

Further, the zeta potential modifiers cited by the examiner (Gresser Col 6, 5, 31, 29 and co. 9, line 11) including silica, sodium silicate, sodium stearate and triethanolamine are not cationic materials, silica being a carrier material with anionic surface charge, and the other

materials being neutral sodium salts of silicate and stearic acid respectfully, and an organic solvent that is commonly used as a base to adjust pH of compositions.

The materials known in the art as fluorescent whitening agents (FWAs), which include Tinopal DMSX, cited by the examiner are dyes that absorb UV light and emit visible light in response to provide whitening to fabrics, and are not polymers nor fluorinated materials. The various materials cited by the examiner are simply ancillary materials common to the art for use in detergents to provide other functions, such as carrier of materials, builder function, pH control and whitening. The examiner will note that these and similar materials are only optional additives in the present invention, being materials well known in the art to provide secondary functionality to the compositions independent of the novel features of the inventive compositions employed.

Accordingly, Gresser considered alone or together in light of Haq et al., fails to teach or suggest any material limitations of the present invention.

E. Concluding Remarks

In light of the above, it is respectfully submitted that all of the claims now pending in the subject patent application should be allowable, and a Notice of Allowance is requested. The Examiner is respectfully requested to telephone the undersigned if he can assist in any way in expediting issuance of a patent.

The Commissioner is authorized to charge any underpayment or credit any overpayment to Deposit Account No. 06-1325 for any matter in connection with this response, including any fee for extension of time, which may be required.

Respectfully submitted,

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